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COMPREHENSIVE
EVERGLADES
RESTORATION PLAN

Additional Water
Quality Projects May Be
Needed and Could
Increase Costs

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Mr. Chairman and Members of the Subcommittee:

The South Florida Ecosystem Restoration Initiative is a complex, long-term effort to restore the South Florida ecosystem, which includes the Everglades. Because water is key to restoring the ecosystem, one of the initiative's major goals is "getting the water right"—or improving the quality, quantity, timing, and distribution of water in the ecosystem. The primary means of achieving this goal is through the U.S. Army Corps of Engineers' Comprehensive Everglades Restoration Plan (the Plan). Although achieving the right quantity, timing, and distribution of water is important, improving its quality is critical to sustaining and restoring the South Florida ecosystem. The Plan represents one of the most ambitious restoration efforts the Corps has ever undertaken; it contains 66 individual projects that are scheduled to take more than 20 years to complete.^{1,2} Implementing the Plan is currently estimated to cost \$7.8 billion—a cost that will be shared equally by the federal government and the state of Florida. We are here today to discuss our report,³ which is being released today, on (1) the role of the Corps' Comprehensive Everglades Restoration Plan in addressing the major water quality concerns in the ecosystem and (2) modifications that may be needed as the Corps implements the Plan after it has been authorized by the Congress.

In summary, Mr. Chairman, the Corps' Comprehensive Everglades Restoration Plan provides a conceptual framework for improving the quality, quantity, timing, and distribution of water in the South Florida ecosystem. Twenty-four of the Plan's 66 projects are intended, among other things, to improve the quality of water in the natural areas of the ecosystem; the remaining projects deal more with the water's quantity, timing, and distribution. The water quality projects in the Plan are intended to supplement the efforts of the state, which has the primary responsibility for achieving water quality standards in Florida. Under the Water Resources Development Act of 1996, the Corps is allowed to include water quality projects in the Plan and equally share the costs with Florida if the projects are essential to restoring the Everglades.

¹The Comprehensive Everglades Restoration Plan includes 68 projects, but 2 of these projects were funded under another program's authority. As a result, there are 66 projects remaining in the Plan. Many of the projects have multiple purposes and contain multiple features. We use the term "projects" to refer to the 66 projects and their features.

²The Corps estimates that most projects will be completed within 20 years; however, the projected time frames for two large reservoir projects extend over 35 years. According to Corps officials, appropriations levels will affect these time frames.

³*Comprehensive Everglades Restoration Plan: Additional Water Quality Projects May Be Needed and Costs Could Increase*(GAO/RCED-00-235, Sept.14, 2000)

Modifications and additions to the Plan will likely be necessary as uncertainties related to implementing the Plan's projects are resolved and more information is gathered about the extent of the ecosystem's water quality problems. These changes could increase the total cost of the Plan over the Corps' current estimate of \$7.8 billion. Currently, there are too many uncertainties to estimate the number and costs of the Corps projects that will ultimately be needed to address water quality in the ecosystem. The Corps has acknowledged the uncertainty in the Plan and has included a process for incorporating project modifications and additions in its future reports to the Congress. It has not, however, included a means for reporting (1) cumulative changes in projects and costs for the Plan as a whole and (2) the progress being made in implementing the Plan. Such information will be important for the Congress in authorizing future projects. Our report recommends that the Corps provide the Congress with updates that provide this information when the Corps submits future project authorization proposals. Both the Corps and the state of Florida concurred with our recommendation.

Background

Following major droughts from the 1930s through the mid-1940s and hurricanes in 1947, the Congress authorized the Corps to construct the Central and Southern Florida Project. The project—an extensive system of 1,700 miles of canals and levees and 16 major pump stations—prevents flooding and saltwater intrusion into the state's aquifer while providing drainage and water to the residents of South Florida. The project's canals now divert much of the water that historically flowed south from Lake Okechobee through the Everglades to Florida Bay east and west to the ocean or to agricultural and urban uses. Although the Corps' Central and Southern Florida Project accomplished its objectives, it had unintended detrimental environmental effects. Coupled with urban and agricultural development, the project has led to significant deterioration in the South Florida ecosystem's water quality.

Recognizing that the Central and Southern Florida Project needed to be modified to address its negative impact on the environment of South Florida, the Congress included provisions relating to the project in the Water Resources Development acts of 1992 and 1996. The 1992 act provided the Secretary of the Army, who delegated this responsibility to the Corps, with the authority to study the original design of the project in order to determine whether modifications were needed because of changes in the ecosystem's physical, biological, demographic, or economic

conditions. The 1996 act directed the Corps, on the basis of its initial review, to prepare a feasibility report and a programmatic environmental impact statement to determine what changes were needed to restore the South Florida ecosystem. The act required that the Corps report back to the Congress by July 1999.

Because the Plan consists of a large number of projects that will be designed and constructed over a long period of time, according to Corps officials, it is not as detailed as typical Corps feasibility studies. For example, it does not identify specific sites for the proposed projects. The Corps also plans to conduct additional feasibility studies because the time allotted under the 1996 act to complete the Plan did not allow for a thorough investigation of all of the regional water resource problems in South Florida. The Corps will design the projects in more detail and expects to request the Congress to authorize a new set of projects every 2 years until all the projects are authorized, which the Corps anticipates will take until 2014.⁴

The Plan will be carried out primarily by one federal agency—the Corps—and one state agency—the South Florida Water Management District (the District), which manages water resources for South Florida and is the Corps' local sponsor, or partner.⁵ These two agencies are responsible for operating the Central and Southern Florida Project as it is currently configured and will be responsible for planning, designing, and constructing the Plan's projects to reconfigure it. The agencies are responsible for meeting both the water supply and water quality goals in the Plan. Furthermore, under the Clean Water Act, which seeks to restore and maintain the physical, chemical, and biological integrity of the nation's waters, the projects must be designed to meet applicable state water quality standards.⁶

The Projects in the Corps' Plan Supplement Florida's Efforts to Address Water Quality in the Ecosystem

The water quality projects included in the Corps' Plan supplement the efforts of Florida, which is primarily responsible for ensuring compliance with water quality standards in the ecosystem and for ensuring that the projects meet state water quality standards. To identify water quality

⁴Design work is already progressing under the authority of an existing design agreement between the Corps and the District.

⁵Although the South Florida Water Management District is the primary nonfederal sponsor, as many as five counties and city governments and Native American tribes could also serve as nonfederal sponsors for portions of the Plan. The Seminole Tribe of Florida signed a project coordination agreement with the Corps in Jan. 2000 to implement a water resources project on its Big Cypress Reservation.

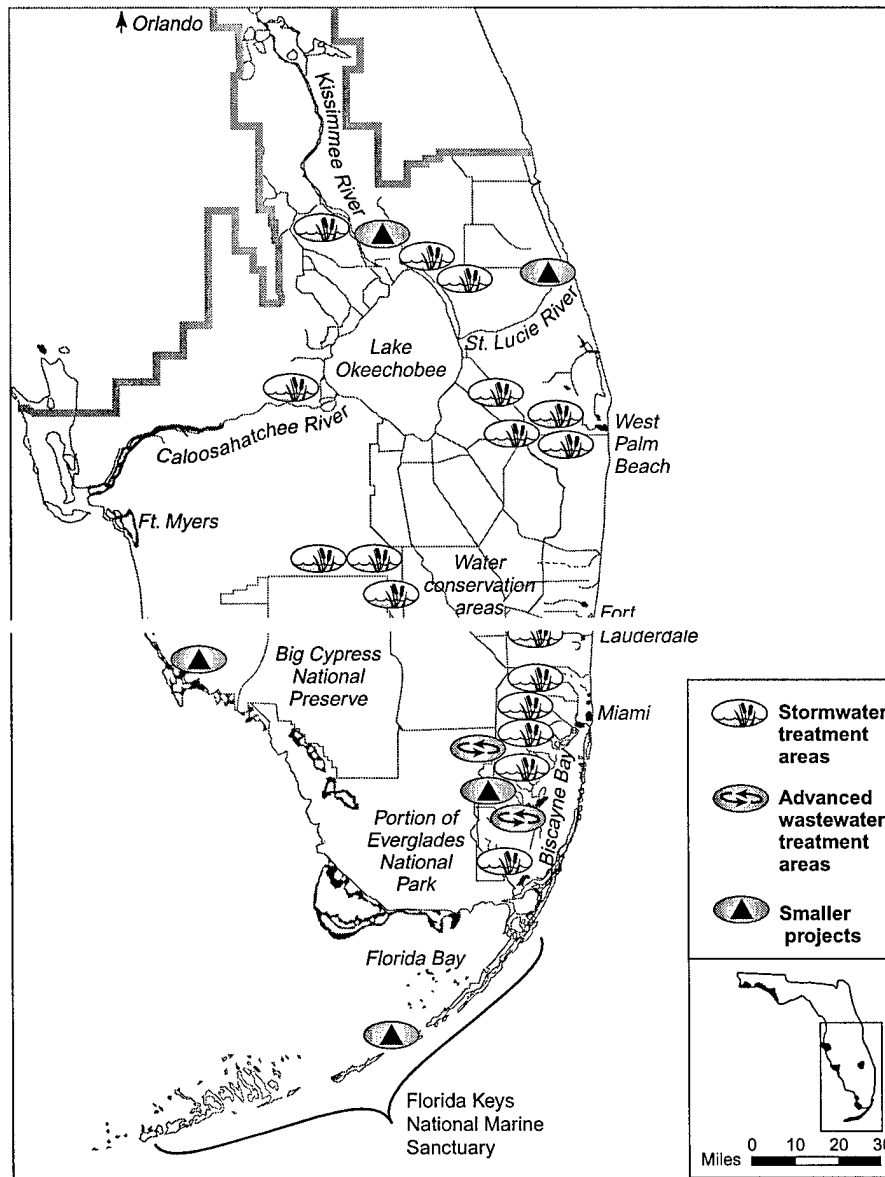
⁶Enacted in 1972, the Federal Water Pollution Control Act is commonly called the Clean Water Act (33 U.S.C. 1251-1387).

projects, the Corps established two criteria. First, the Corps included projects to treat water that is being "reclaimed" as part of the Plan. This water is now being discharged by the Central and Southern Florida Project into the ocean, but under the Plan, it will be diverted, stored, and discharged into natural areas to supplement water supply and improve habitat. Second, the Corps included treatment projects for water that will be "reused." This water will also be reclaimed, but its final use will be changed. For example, the Corps now releases water from Lake Okeechobee to the water conservation areas for flood control purposes and water supply, but under the Plan it will instead release some of this water for environmental purposes. As authorized by the Water Resources Development Act of 1996, the Corps included 24 projects in the Plan to improve water quality in the South Florida ecosystem that the Corps deemed essential to achieve the restoration of the Everglades. These include

- 17 projects to construct stormwater treatment areas in areas where new storage sites will be built to reclaim water or modify its use;
- 2 advanced wastewater treatment facilities to take runoff from the Miami area, treat it, and return it to natural areas to increase the amount of water being provided there; and
- 5 smaller projects, such as the restoration of wetlands or dredging of sediments from lakes or other water bodies, that will have immediate environmental benefits.

The federal and state governments will share the costs of these projects equally. Figure 1 shows the location of the 24 water quality projects included in the Plan.

Figure 1: Location of the Plan's Water Quality Projects



Source: GAO's adaptation of an illustration prepared by the U.S. Army Corps of Engineers.

Resolution of Project Uncertainties and Outcomes of Studies May Lead to Additional Water Quality Projects and Costs

As the Corps implements the Plan, Corps officials believe that modifications to existing projects and additional projects may be necessary, as their details are further developed and as uncertainties about their implementation are resolved. In addition, the Corps plans to conduct several studies that may further identify water quality problems in the ecosystem. If it is determined that additional water quality projects are needed during the Plan's implementation or as a result of these studies, the costs to implement the Plan could increase above the Corps' current \$7.8 billion estimate. Recognizing that additional projects could be needed as the Plan is implemented, the Corps included a process in the Plan to incorporate and report to the Congress on modifications and additions to it. However, the Corps has not included a process for updating the Congress on the cumulative effects of the individual changes on the overall Plan.

This information is primarily based on our discussions with officials from federal and state agencies that have responsibilities for managing water supplies and ensuring water quality in South Florida. Reliance on discussions with federal and state officials was necessary because the Plan is a conceptual document and detailed plans of the projects to be constructed are not yet available.

Resolution of Implementation Uncertainties

The Corps acknowledged that a number of uncertainties associated with implementing the Plan's projects have not yet been resolved and could lead to additional water quality projects. These uncertainties include

- whether planned stormwater treatment areas will be successful in achieving the lowest phosphorus concentration needed,
- whether 245,000 acre-feet⁷ of additional water will be needed for Everglades National Park, and

⁷An acre-foot of water is equal to about 326,000 gallons of water--enough to cover 1 acre to a depth of 1 foot.

- what type and level of treatment will be necessary for water stored in and retrieved from aquifer storage and recovery wells—large underground wells that are one of the primary means in the Plan for storing water.

Impact of Ongoing and Planned Studies

Recognizing that all the water quality concerns in the South Florida ecosystem have not been fully identified, the Corps plans to conduct several feasibility studies to identify such concerns in areas of the ecosystem that were not included when the Plan was developed. These feasibility studies, which focus on the Southwest Florida and Florida Bay/Florida Keys areas, were included in the Plan because there was not enough time when the Plan was being developed for a thorough investigation of all the water resource problems in these areas of the ecosystem. In addition to the feasibility studies proposed in the Plan, the Corps is currently conducting two feasibility studies under the authority of the Water Resources Development Act of 1996—the Indian River Lagoon Feasibility Study and the Water Preserve Areas Feasibility Study—and is conducting a third for Biscayne Bay under a separate authority. These studies will likely identify new water quality projects to add to the Plan and would be in addition to those needed to address the uncertainties involved in implementing the Plan. For example, as a result of the Indian River Lagoon Feasibility Study, the Corps will likely add a water quality project to the Plan to dredge the lagoon to remove sediments from the St. Lucie estuary, a major tributary of the lagoon, to improve the water's quality and clarity.

Moreover, the Plan recommends the development of a comprehensive integrated water quality plan to evaluate and determine whether any additional water quality projects recommended by the state should be added to the Plan. Recognizing that not all of the ecosystem's water quality concerns have been identified, the Corps has included a recommendation in the Plan for the development of a comprehensive integrated water quality plan. According to Corps officials, the water quality plan will be closely coordinated with the South Florida Water Quality Protection Program, which was recently initiated by the state.⁸ As the state program identifies additional projects to improve water quality, the Corps will evaluate whether the projects are essential and

⁸The purpose of the program, which will be developed primarily by those entities that have water quality responsibilities in South Florida, will be to identify water quality problems in the ecosystem; recommend actions to deal with these problems; and identify and coordinate the efforts of the federal, state, tribal, or local agencies that will be responsible for taking action. The key programs that will be coordinated are the state's total maximum daily load program and its activities under Florida's Everglades Forever Act, as well as the Corps' projects in the Comprehensive Everglades Restoration Plan.

whether the federal government should participate in them, share their costs, and include them in its comprehensive plan.

An example of an ongoing restoration effort where the Corps might have a future role is the cleanup of Lake Okeechobee. The lake, which has been described as the "liquid heart of the ecosystem," may require a number of projects to restore the quality of its water. According to Corps officials, these projects could eventually require the Corps' involvement. Currently, Lake Okeechobee—which was once a sandy-bottomed, clear, shallow lake—has high levels of phosphorus that make it prone to algal blooms and cattail growth, adversely affecting the quantity and types of plants and fish in the lake. Despite the implementation of certain permitting programs by the state, the annual phosphorus amounts exceed the state targets. Our discussions with state officials responsible for water quality in Florida indicate that a combination of actions, such as agricultural best management practices and the use of storm water treatment areas, will be needed to lower the levels of phosphorus entering the lake. According to Corps officials, the Corps may participate in the construction of other stormwater treatment areas if the state determines that additional areas are needed. In addition, some federal and state officials believe that if large deposits of phosphorus-laden sediment remain in the lake, the lake's water quality will remain a significant problem. Although no final decision has been made on what actions to take, a preliminary estimate prepared by an issue team of federal and state scientists showed that fully dredging the lake could cost at least \$1 billion. Pending Florida's completion of a feasibility study on options to remove the sediment, the Corps could become involved if it decides that the proposed action is essential to the restoration of the ecosystem.

The Plan Includes a Process for Incorporating and Reporting Change

To allow for changes that will result as uncertainties involved in implementing the Plan's projects are resolved, including the possible addition of water quality projects, the Corps' Plan includes three ways to incorporate changes: (1) additional efforts, such as surveys, mapping, and water quality analyses, that are needed to develop the final design of the projects; (2) pilot projects conducted to resolve technical uncertainties; and (3) an adaptive assessment process, which involves monitoring the systemwide effects of the projects on the ecosystem as they are implemented. The Corps has also included a process in the Plan for authorizing future projects,

including any changes, either modifications or additions, that result from its additional planning efforts. As it prepares to move forward with a project, the Corps will submit to the Congress a project implementation report that includes the detailed technical information necessary to design a project or a group of similar projects. These reports will be used to add, remove, or modify projects in the Plan and, except for the projects presented for initial authorization, will be presented to the Congress for authorization every 2 years until 2014—when the Corps anticipates that all of the projects needed for the restoration effort will have been authorized. Although the reports will contain recommendations for any modifications to the Plan whose need was determined by systemwide evaluations, the Corps does not currently plan to report to the Congress on the cumulative changes that have been made to the Plan. Such a report would provide the Congress and the state with an understanding of how the Plan is evolving, as well as an update every 2 years on the costs of the projects and the Plan.

Mr. Chairman, achieving water quality improvements in the South Florida ecosystem will depend on several programs and efforts, including the Corps' Plan. Although the Plan currently includes 24 projects to address the quality of water in natural areas of the ecosystem, there are too many uncertainties to estimate the number and costs of the projects that will ultimately be needed to improve water quality. Given the Plan's conceptual nature and the likelihood of changes and additions to its projects, we recommend in our report that the Secretary of the Army, when submitting subsequent authorization proposals, provide the Congress with updates that

- reflect the cumulative project and cost changes to the overall Plan and
- indicate the progress being made toward implementing the Plan.

Both the Corps and the state of Florida agreed with our recommendation. The Corps also agreed that there are many uncertainties associated with implementing the overall Plan and the projects to improve water quality in the South Florida ecosystem. The Corps believes that the uncertainties have been fully disclosed and has proposed a methodology that will address them. This methodology includes the development of project implementation reports. We recognize that the Corps was aware of the uncertainties associated with implementing the Plan and our report describes in detail the process that the Corps included in the Plan to incorporate

changes as the uncertainties are resolved. We believe that the resolution of these uncertainties may lead to additional water quality projects and will likely result in cost increases. The state took exception to the inclusion of the \$1 billion cost estimate for dredging Lake Okeechobee in our report and maintained that we characterized the Corps' involvement as inevitable. We do not believe that our report characterized the Corps' involvement in dredging Lake Okeechobee as inevitable. We included Lake Okeechobee as an example of an area where, through the state's efforts to identify actions needed to improve water quality in the South Florida ecosystem, the Corps could have a future role. We point out in our report that the state has not yet determined all of the actions that will be needed to clean up Lake Okeechobee and that the Corps' role has not yet been defined. However, to emphasize that point, we revised this section of our report to reiterate that once the state determines which projects are necessary, the Corps will determine if the additional projects are essential to the ecosystem's restoration and decide if the federal government will participate in and share the costs of the additional projects.

This concludes our statement. We will be happy to respond to any questions from you or other Members of the Subcommittee.

Contact and Acknowledgement

For further information on this testimony, please contact Barry Hill at (202) 512-3841.

Individuals making key contributions to this testimony included Susan Iott, Chet Janik, and Sherry McDonald.

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